



CIRM Shared Research Laboratory Information Form – Part Two

Section A. Project Information

Project Title The Berkeley Human Embryonic Stem Cell Shared Research Laboratory

Limited to 300 Characters

Project Start Date Jul 1, 2007

Construction Start Date Dec 1, 2007

Occupancy Date Mar 31, 2008

Total Part Two Funds Requested for Shared Laboratory Space \$1,779,719

Total Part Two Funds Requested for Stem Cell Techniques Course

Total Capital Funds Requested \$ 529,719

Note: All green fields are calculated values. Do not enter a value in the field.

Please indicate whether you propose to apply for funding of a Stem Cell Techniques Course along with the Shared Laboratory Space, or just the Shared Laboratory Space.

☒ Shared Research Laboratory only

☐ Shared Research Laboratory and Stem Cell Techniques Course

NOTE: Please be aware that any information you provide in this form will be made publicly available.

Section A. 1. Program Director

Name	Professor	David	Vernon	Schaffer	
	Prefix	First	Middle	Last	Suffix
Email (office)	schaffer@berkeley.edu			This email address identifies you to CIRM. Please use this email address for all correspondence with CIRM.	
Application Number	CL1-00519-1			This field should fill automatically, based on the email address. If not, enter the number you received via email from CIRM, in the form "XX9-99999-9", where "X" is a letter, and "9" is a digit.	

Section A. 2. Facilities Contact

Name	Mr.	Robert	G	Bluhm	
	Prefix	First	Middle	Last	Suffix
Institution	University of California, Berkeley				If your institution is not listed, please identify the name of the institution here.
Other Institution					
Position Title	Assistant Director, Project Management				
Department	Capital Projects				
Address	1936 University Avenue, 2nd Floor				
City	Berkeley			CA	Zip Code 94720-1380
Phone Number	(510) 643-7166		Ext	Fax Number (510) 642-7271	
Email (office)	rbluhm@cp.berkeley.edu			This email address identifies you to CIRM. Please use this email address for all correspondence with CIRM.	



CIRM Shared Research Laboratory Information Form – Part Two

Section A. 3. Public Abstract

See Appendix A.

Section A. 4. Statement of Benefit to California

See Appendix A.



CIRM Shared Research Laboratory Information Form – Part Two

Section B. Laboratory Renovation Plan

Project Manager	Robert Bluhm	Construction Supervisor	Robert Bluhm
Title	Assistant Director, Project Management	Title	Asst Director, Project Management
Company/Institution	UC Berkeley	Company/Institution	UC Berkeley

Describe plans for development/renovation of the shared laboratory space including fixed equipment costs. Include a description of the current space and how it will be renovated and reconfigured to form the laboratory. Include as attachments one 11x17 page of the current floor plan space and one 11x17 page of proposed floor plan of the renovated space. Describe all renovations that will be done. Describe how the project will be managed and tracked, as well as how change orders will be handled. For laboratories that are proposed to be located in leased space, provide information regarding the institution's long-term access to the leased space. Describe plans and schedule for all phases of development including design, construction, and installation of equipment leading to a functional laboratory. Give a proposed contingency plan in case of cost overruns. Any additional costs due to budget overruns will be the responsibility of the grant recipient. (narrative limited to 3 pages)

Description of current space and proposed renovations:

The Berkeley Stem Cell Center (<http://stemcellcenter.berkeley.edu/>), which unites nearly 30 investigators from the University of California at Berkeley (UCB), Children's Hospital Oakland Research Institute (CHORI), and Lawrence Berkeley National Laboratory (LBNL), has several major emphases: (1) mechanisms of human embryonic stem cell (hESC) self-renewal, (2) hematopoietic development and differentiation, (3) neural development and differentiation, and (4) cardiovascular and muscle tissue engineering. Numerous collaborations among these scientists and bioengineers have successfully utilized both Federal registry and non-registry hESC lines; however, a core facility for hESC investigations free of Federal constraints will greatly facilitate this research.

We therefore propose to establish the Berkeley Human Embryonic Stem Cell Shared Research Laboratory for cell culture and analysis, which will serve as a central resource to greatly enhance stem cell research in the community. The Laboratory will be hosted at UCB, which has strong experience in and infrastructure for the administration of such facilities. The resulting resource will scientifically bridge institutions of the East Bay region by enabling the centralized culture and maintenance of many hESC lines to benefit numerous investigators and collaborations.

The current space (205 assignable sq ft that is being shared with the Gene Targeting Facility in the Life Sciences Addition) and resources for non-registry hESC culture are extremely limited. We therefore propose to significantly expand these capabilities. The new, 285,000 gross sq ft Stanley Biosciences and Bioengineering Building is nearly complete, with the first research groups moving in during April, 2007. This building will house the laboratories of Stem Cell Center members Conboy, Fletcher, Healy, Kumar, Li, and Schaffer. Three adjoining rooms in this building with a total of 685 assignable sq ft will be devoted to the Shared Laboratory for culture and analytical equipment. In addition, we will renovate and equip new space (308 sq ft) in the Life Sciences Addition to expand its current capacity, as LSA houses numerous members of the Stem Cell Center (Harland, Ngai, Raulet, Robey, Schissel, Winoto, and Wurmser). Other campus members are in nearby buildings. Importantly, CHORI and LBNL staff will be provided a local parking permit to optimize access to the Shared Laboratory. The result will be a 1000 sq ft Shared Research Laboratory with the locations and size to meet the growing demand for hESC research resources on campus and in the East Bay region.

The Stanley Building is a state-of-the-art laboratory facility for biosciences and bioengineering, and the renovation for CIRM would be located on the first basement level, sharing a floor with other bioengineering labs in the field of tissue engineering (Conboy, Healy, and Li) and thereby facilitating a close collaboration among these and other research teams. The building as a whole co-locates researchers in the fields of structural biology, chemical biology, computational biology, bio-nanotechnology, imaging, and tissue engineering and is designed to actively promote synergy among these disciplines. The proximity of the CIRM labs to these teams and their uniquely broad range of specialized labs is intended to stimulate creative and collaborative research.

The space in Stanley for the CIRM labs (rooms B127, B127A, and B129) was originally designed for surface analysis preparation, light microscopy, and for PCR/RT-PCR, tailored to the needs of tissue engineering research. The proposed renovations will modify these spaces to provide space for tissue culture (B127), flow cytometry and materials synthesis (B129), and imaging capabilities (B127A). Specific components of the renovation are itemized in the budget in Section B.2.



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Section B -- 1. Laboratory Renovation Plan (continued)

In the tissue culture room (B127), three 6' Baker biosafety cabinets will be installed, with laboratory vacuum and seismic constraint, to provide ample capacity for stem cell investigators. In addition, casework on the east wall will be removed to provide space for stacked incubators and CO₂ tanks, and modifications will be made to the casework on the north wall for lab gases and for additional storage units. Furthermore, the door currently joining B127 and B127A will be removed and filled, both to make additional space for the insertion of a biosafety cabinet as well as to remove a source of airflow that could compromise the clean environment of the room. Next, significant modifications to the mechanical system are required in B129 to house a new exhausted laminar flow hood for materials synthesis. A number of research groups who will use the Shared Laboratory work on the design of novel bioactive materials to support and control the proliferation and lineage specific differentiation of hESCs (Conboy, Healy, Fletcher, Kumar, Li, and Schaffer). Polymer initiators, monomers, and crosslinkers are often toxic, and the laminar flow hood will protect users from these components. In addition, the hood will provide a clean environment, adjacent to the cell culture facility, for the synthesis of materials for cell culture applications. Finally, a flow cytometer will be housed in this room (see Section B.2).

In the microscopy room (B127A), laser safety components must be provided to accommodate a new confocal microscopy system, additional cooling will be provided by a new fan-coil unit, and ductwork revisions will minimize air turbulence around this sensitive instrument. Also, a door will be opened on the south side of the room to replace the current door to room B127 (the fire marshal has preliminarily approved of this scenario).

Additional tissue culture space is also proposed on the 4th floor of the Life Sciences Addition, which was completed in 1988. This will serve a second major cluster of stem cell researchers in this precinct of the campus and is located in close proximity to the campus's Flow Cytometry Facility of the Cancer Research Laboratory. Room 428 LSA will be renovated as a dedicated hESC culture facility, separate from the gene targeting core. Specifically, in this room an outmoded biosafety cabinet and fixed casework would be removed and replaced with a new 6' Baker biosafety cabinet, and an existing new laboratory bench and microscope table (for an existing standard microscope) will be installed. The result will be an integrated Human Embryonic Stem Cell Shared Research Laboratory that will foster collaborative research by investigators from UCB, CHORI, and LBNL on non-registry and registry hES lines.

Project management, tracking and change order management:

The project manager and his team specialize in the design and construction of laboratory projects and have been directly involved in the development of the Stanley Building. Their knowledge of Stanley's design and infrastructure systems will be of great benefit to the execution of the CIRM project. Systematic reviews of the design of the proposed remodels will be undertaken by the campus's engineers within Physical Plant and by licensed engineers in Capital Projects. The fire marshal, the Office of Environment, Health and Safety, and the campus's Biosafety Officer all formally participate in project reviews. Preliminary input has already been provided to help guide the proposed program and drawings. During construction, staff and consultant inspectors are assigned for each discipline – general architectural, mechanical and plumbing, and electrical – to ensure code compliance and consistency with campus design and engineering standards.

In general for such projects, costs are continually tracked and reported utilizing project management's standard Facilities Status Report spreadsheets. Weekly construction meetings are held and action lists tracked. The team always projects the anticipated cost at completion, flags risks, and recommends corrective actions on a weekly basis. For this scale of project, change orders are reviewed for entitlement and for fair pricing by the project manager with the technical support of staff engineers highly experienced in cost review and contractor negotiation for projects of this type.

Plans and schedule for all phases of development:

Key schedule milestones are listed in Section B.1. The project's goal is to take advantage of the new Stanley Building's modern and flexible laboratory infrastructure to minimize the extent of the proposed renovations. The highly targeted nature of the remodeling allows for cost-effective, rapid design and construction delivery.

Much of the programming and preliminary design have already been completed. It is anticipated that detailed engineering will be required only in select areas, for example, to serve the new exhausted laminar flow cabinet and to support the new laser



CIRM Shared Research Laboratory Information Form – Part Two

Section B -- 1. Laboratory Renovation Plan (continued)

system. In many areas, carefully pre-qualified building subcontractors may provide any additional engineering and calculations as needed in order to streamline the schedule and expedite completion. Required regulatory reviews include those by the campus fire marshal and by the local office of the state architect for accessibility review. Internal reviews include those by Physical Plant, inspection services, the Office of Environment, Health and Safety, and the campus Biosafety Officer. Pre-reviews have already been held with the fire marshal, and other proposed design elements are consistent with recently approved systems already in place in the Stanley Building. It should be noted that this preparatory work will also serve to expedite delivery of this project.

Contingency plan in case of cost overruns:

Fund 47261, administered by the Office of the Vice Chancellor for Research, holds \$550,000 donated by generous UC Berkeley alumni to support stem cell research on campus. Chancellor Birgeneau and Stem Cell Center Director Randy Schekman have approved the use of \$200,000 from 47261 as matching funds for the equipment portion of this proposal. They have also agreed that 47261 may be used as necessary to cover any cost overruns in the proposed design and construction budget for this project. Please see attached letters of support.





CIRM Shared Research Laboratory Information Form – Part Two

Section B. 1. Schedule/Timeline and Drawdown of Funds Table

Provide a realistic schedule and drawdown of funds for completing each activity/milestone, as indicated below.

#	Activity/Milestone	Start Date	Completion or Milestone Date	Amount of CIRM funds to be drawn
1	Grant Award (estimate)		Jul 1, 2007	
2	Request for Planning Funds (10% of Construction Costs)		Jul 1, 2007	\$ 42,378
3	Prepare Preliminary Plans	Jul 1, 2007	Aug 31, 2007	
4	Approval of PPs		Aug 31, 2007	
5	Prepare Working Drawings	Sep 1, 2007	Oct 31, 2007	
6	Approval of WDs		Oct 31, 2007	
7	Request Construction Contract funds (80% of Construction Costs)		Oct 31, 2007	\$339,020
8	Advertise for Construction Contract	Nov 1, 2007	Nov 30, 2007	
9	Award Construction Contract		Dec 1, 2007	
10	Construction Activities	Dec 1, 2007	Feb 28, 2008	
11	Completion of Equipment Purchases		Feb 28, 2008	
12	Request Equipment Purchase funds		Mar 1, 2008	1,000,000
13	Beneficial Occupancy		Mar 31, 2008	
14	Notice of Completion		Apr 15, 2008	
15	Request Construction Completion Amount (10% of Construction Funding)		Apr 15, 2008	\$ 42,378

"Preliminary Plans" (PPs) represent approximately 35 percent of the design effort, or may be considered the product of completing the "Design Development" (DDs) phase of architectural work.

"Working Drawings" (WDs) represent drawings and specifications from which a contractor may determine the full extent of work contemplated in the project for purposes of submitting a bid; may be referred to as completion of "Construction Documents" (CDs) phase of architectural work.



CIRM Shared Research Laboratory Information Form – Part Two

Section B. 2. Budget

Provide a complete budget for the renovation that includes construction costs, design fees, administration of the project, other costs (i.e. installation of equipment) and a construction contingency (limited to 7-10% of the construction budget). Identify the amount of CIRM funds requested and the matching funds (construction requires 20% matching funds). Provide a complete budget for movable equipment (equipment requires 20% matching funds). (narrative limited to 3 pages)

(Note: An Excel spreadsheet can be attached as long as the total submission for this Section is limited to 3 pages)

The attached 2 page spreadsheet itemizes each cost, organized by room. The construction contingency has been calculated at 10% of the construction subtotal, given the early programming phase of the project. Also, the contingency is designed to reflect tight ceiling conditions and potentially restricted access, especially for the new exhaust duct branch and related work that would be required for the proposed new exhausted laminar flow cabinet. Also, work will occur in dimensionally restricted areas to accommodate the additional cooling elements for the proposed new laser imaging system.

Costs for planning, design and administrative costs, which total \$55,275, have been kept to 13% of the proposed renovation grant of \$423,775. In addition, the institutional renovation match of \$105,944 (see Section B.4) is a fraction of what has actually been invested since January, 2005, in the construction of the proposed hESC Shared Research Laboratory rooms in the Stanley Building, which also includes casework, mechanical and safety systems.

We also propose to purchase and install moveable equipment to create a state-of-the-art East Bay regional laboratory for unfettered human embryonic stem cell research. In the Stanley Building, Room B127 will be the cell culture room and will house four Forma incubators and a Zeiss inverted microscope with fluorescence capabilities for routine imaging with a small CCD camera and PC computer for documentation. In addition, a refrigerator (Fisher Isotemp) will be placed in B127 for storage of cell culture reagents. Room B127A will house a Beckman Coulter FC500 analytical flow cytometer for rapid quantification of marker expression in cultures of hESCs and their progeny. In addition, this room will house -20C, -80C, and cryogenic storage space for cell culture needs.

Room B129 will house a two photon confocal fluorescence microscope with live cell culture chamber, which will serve several major needs. First, a number of specimens to be examined are extremely thick, such as hESC cultures inside three dimensional biomaterials (as well as histology samples), and a 2p instrument will enable visualization deep into these samples. Furthermore, imaging cell growth and differentiation over time inside culture samples will benefit from the live cell chamber, and the 2p capabilities will reduce the cytotoxicity inherent in fluorescence imaging. We propose to obtain a Zeiss 510 2p confocal system.

Finally, the Life Sciences Addition, which houses a second cluster of stem cell researchers, will have a second cell culture room to further increase the capacity and maximize the convenience of the Shared Laboratory for the campus and surrounding institutions. Two Forma incubators will be installed here. An existing (non-federally funded) microscope and refrigerator would be utilized. A fluorescence activated cell sorter (FACS) will be housed in the Flow Cytometry Facility (FCF) of the Cancer Research Laboratory (418 LSA, <http://biology.berkeley.edu/crl/>), adjacent to the LSA culture room (with 188 sq ft of space for the new sorter). The FCF is now equipped with two sorters, a Dako-Cytomation MoFlo and a Beckman-Coulter EPICS Elite, which is a problematic situation. Two sorters for a research community of Berkeley's size is insufficient to accommodate stem cell research needs, evident from waiting lists often up to 3 weeks to obtain cell sorting time on an instrument. Furthermore, the EPICS Elite sorter, which is 16 years old, is a slow sorter whose maintenance is of increasing concern. We therefore propose to decommission this sorter and replace it with a MoFlo FACS instrument. Coupled with a second operator (proposed in Part One of this application), this faster sorter will increase the FCF sorting capacity by 50%, which will be devoted to stem cell work. Furthermore, this new sorting capability will build on the existing FCF infrastructure, which will ensure smooth and experienced management of the instrument.

The total budget for moveable equipment will be \$1,200,000, which will consist of \$1,000,000 requested from CIRM, as well as \$200,000 in institutional funding match and \$50,000 in Stanley Building construction costs as a match (see Section B.4).

Finally, it should be noted that the renovation budget (Section B) includes provisions for bracing equipment as necessary for seismic safety. The result of these efforts will be a modern human embryonic stem cell culture facility that will optimize research and collaboration among East Bay investigators.



CIRM Shared Research Laboratory Information Form – Part Two

Section B. 3. Budget Summary Table

Complete the budget summary for the use of CIRM funds.

Note: All colored fields contain calculated data. Please do not enter anything in those fields.

Other Project Costs				
Budget Category		Total Budget	CIRM Grant Funds	Institutional Match
Construction Contract Costs		\$ 433,944	\$ 328,000	\$ 105,944
Other Construction Costs (institutional)		\$ 7,500	\$ 7,500	
Subtotal Construction		\$ 441,444	\$ 335,500	\$ 105,944
Design Fees		\$ 15,775	\$ 15,775	
Administrative Costs		\$ 39,500	\$ 39,500	
Construction Contingency		\$ 33,000	\$ 33,000	
Total Construction		\$ 529,719	\$ 423,775	\$ 105,944
Movable Equipment		\$1,250,000	\$1,000,000	\$ 250,000
Total Budget		\$1,779,719	\$1,423,775	\$ 355,944
Gross Square Feet	1655	\$ 320.07	\$ 256.06	Const Costs/GSF
Assignable Square Feet	993	\$ 533.45	\$ 426.76	Const Costs/ASF



CIRM Shared Research Laboratory Information Form – Part Two

Section B. 4. Institutional Commitment

Provide a detailed description of the amount and source of matching funding for each request that requires matching funds. The requirement of matching funds can be satisfied if the institution can document funds, excluding other grant funds, committed to similar projects (i.e., renovation of lab space and equipment purchase) after January 1, 2005. Detail the use of the space after the three year period is completed. (narrative limited to 2 pages)

Construction match:

The institutional match of the renovation portion of the budget consists of a small share of the value of the construction of the new Stanley Building put in place after January 1, 2005. Construction of Stanley commenced in February, 2003, and is nearing completion, with the first occupants scheduled to move into the facility in April, 2007. The first two years of construction comprised demolition of an existing structure, excavation, erection of the structural frame, exterior enclosure of the building, and provision of major mechanical and electrical building equipment. From January 1, 2005, until the imminent completion, construction has included partitions and doors, ceilings and all finishes, distribution of ductwork and plumbing systems, elevators and stairs, and laboratory fixed equipment including casework and fume hoods. Much of this state-of-the-art infrastructure will be utilized by the proposed CIRM-funded project, which will require only targeted modifications and customizations of the newly provided space.

The total building construction cost per gross square foot of new Stanley Hall is \$411, based on a total building area of 285,000 gsf and a total building construction cost of \$117,135,000. The value of the work constructed after January 2005, and expenditures after that date, is approximately 45% of the total, or approximately \$185/gsf.

The area in the Stanley Building proposed for the CIRM-funded renovations is 685 assignable square feet, or 1,142 gross square feet (assuming a building efficiency of 60%). A contribution of \$92.77/gsf (a small share of the actual installed value of \$185/gsf) applied over the 1,142 gsf renovation area would yield a value of \$105,944, which is proposed as Berkeley's 20% institutional match for the construction part of this project.

Movable equipment match:

We also have funds to match the requested equipment budget. Specifically, Fund 47261, administered by the Office of the Vice Chancellor for Research, holds \$550,000 donated by generous UC Berkeley alumni to support stem cell research on campus. Chancellor Birgeneau and Stem Cell Center Director Randy Schekman have approved the use of \$200,000 from 47261 as partial matching funds for the equipment portion of this proposal. The remainder of the \$50,000 matching funds for equipment will come from the construction costs of the Stanley Building (as per the March 9th email from Ed Dorrington: "Applicants may use either renovation funding or equipment funding to provide the matching funds. The RFA does not specify that the matching funds have to be from the same category of expenditure as the Grant fund request.") A contribution of \$43.78/gsf (again a small share of the actual installed value of \$185/gsf) applied over the 1,142 gsf renovation area would yield a value of \$50,000, which will provide the remainder of Berkeley's institutional match for the equipment part of this project.

The Chancellor and the Director have also agreed that 47261 may be used as necessary to cover any cost overruns in the proposed design and construction budget for this project. Please see the attached strong letters of commitment to the Shared Research Laboratory from Chancellor Birgeneau, Vice Chancellor of Research Beth Burnside, and Director Randy Schekman.

Use of space after 3-year grant period:

We emphasize that Berkeley has a strong interest in establishing this Laboratory as a sustainable, valuable, and long term resource for the community, analogous to other core facilities on campus such as the Cancer Research Laboratory (established in 1951). The Berkeley Stem Cell Center considers this Laboratory to be a critical research capability and will therefore actively work to secure non-federal funds for the operation of this stem cell facility beyond 3 years from CIRM, disease foundations, and private sources.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. Stem Cell Techniques Course (if applicable)

Based on the information provided in Part One of the application describing the course, include a justification of the additional space required and additional equipment requested, if any. Include additional square footage and provide as an attachment one 11x17 page of the proposed floor plan of the renovated space. (narrative limited to 1 page)

Limit narrative to visible field area.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 1. Schedule and Drawdown of Funds Table (if applicable)

Provide a realistic schedule and drawdown of funds for completing each activity/milestone, as indicated below.

#	Activity/Milestone	Start Date	Completion or Milestone Date	Amount of CIRM funds to be drawn
1	Grant Award (estimate)			
2	Request for Planning Funds (10% of Construction Costs)			\$ 000
3	Prepare Preliminary Plans			
4	Approval of PPs			
5	Prepare Working Drawings			
6	Approval of WDs			
7	Request Construction Contract funds (80% of Construction Costs)			\$ 000
8	Advertise for Construction Contract			
9	Award Construction Contract			
10	Construction Activities			
11	Completion of Additional Equipment Purchases			
12	Request Additional Equipment Purchase funds			
13	Beneficial Occupancy			
14	Notice of Completion			
15	Request Construction Completion Amount (10% of Construction Funding)			\$ 000

"Preliminary Plans" (PPs) represent approximately 35 percent of the design effort, or may be considered the product of completing the "Design Development" (DDs) phase of architectural work.

"Working Drawings" (WDs) represent drawings and specifications from which a contractor may determine the full extent of work contemplated in the project for purposes of submitting a bid; may be referred to as completion of "Construction Documents" (CDs) phase of architectural work.

"Additional Equipment" represents equipment to be used for the Stem Cell Techniques Course.



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 2. Budget (if applicable)

Provide a complete budget for the additional renovation that includes construction costs, design fees, administration of the project, other costs (i.e. installation of equipment) and a construction contingency (limited to 7-10% of the construction budget). Identify the amount of CIRM funds requested and the matching funds (construction requires 20% matching funds). Provide a complete budget for additional movable equipment (equipment requires 20% matching funds). **(narrative limited to 3 pages)**

(Note: An Excel spreadsheet can be attached as long as the total submission for this Section is limited to 3 pages)



CIRM Shared Research Laboratory Information Form – Part Two

Section C. 3. Budget Summary Table (if applicable)

Complete the budget summary for the use of CIRM funds.

Note: All colored fields contain calculated data. Please do not enter anything in those fields.

Other Project Costs				
Budget Category		Total Budget	CIRM Grant Funds	Institutional Match
Construction Contract Costs				
Other Construction Costs (institutional)				
Subtotal Construction				
Design Fees				
Administrative Costs				
Construction Contingency				
Total Construction				
Additional Movable Equipment				
Total Budget				
Gross Square Feet		\$ 0.00	\$ 0.00	Const Costs/GSF
Assignable Square Feet		\$ 0.00	\$ 0.00	Const Costs/ASF



CIRM Shared Research Laboratory Information Form – Part Two

Section D. Signature Page

Complete, save, and print Part Two of the Shared Research Laboratory Grant Information.

Submit electronic application as an email attachment to laboratory@cirm.ca.gov no later than 5:00pm PST on March 16, 2007.

Mail* the original executed Part Two application and five (5) copies to:

Shared Research Laboratory Grant Application

California Institute for Regenerative Medicine

210 King Street

San Francisco, CA 94107

***Mailing must be postmarked no later than March 16, 2007.**

Applications will not be accepted after these deadlines.

Project Start Date

Jul 1, 2007

Construction Start Date

Dec 1, 2007

Occupancy Date

Mar 31, 2008

Total Part Two Funds Requested for Shared Laboratory Space

\$1,779,719

Total Part Two Funds Requested for Stem Cell Techniques Course

Total Capital Funds Requested

\$ 529,719

Facilities Contact

Mr. Robert G Bluhm
Assistant Director, Project Management
Capital Projects
University of California, Berkeley
1936 University Avenue, 2nd Floor
Berkeley, CA 947201380
(510) 643-7166
rbluhm@cp.berkeley.edu

Authorized Organizational Official

Date

Print Name

Title

Program Director

Date

Print Name

Title



CIRM Shared Research Laboratory Information Form – Part Two Supplement

Project Information

Application Number

Program Director Name:

Historical Performance

Provide information on past performance for 3 projects.

	Project 1	Project 2	Project 3
Brief Project Title	Latimer 6th Floor Biosci.	Birge Grnd Fl Phys Sciences	Latimer 8th Fl Bioscience
Original Budget (Total project cost)	\$1,279,000	\$1,600,000	\$1,320,000
Final project cost	\$1,271,000	\$1,319,000	\$1,303,000
Scheduled Completion Date	Aug 31, 2004	Jan 31, 2005	Aug 31, 2005
Actual Notice of Completion Date	Aug 31, 2004	Jan 31, 2005	Aug 31, 2005
Gross Square Feet involved	3,538	3,667	3,500
Assignable Square Feet involved	2,123	2,200	2,100
Approximate number of change orders	3	0	0
Value of all change orders & claims	\$ 210,213	\$ 000	\$ 000
Type of construction management	Design-Bid-Build	Other	Design-Bid-Build

Laboratory Alteration Projects

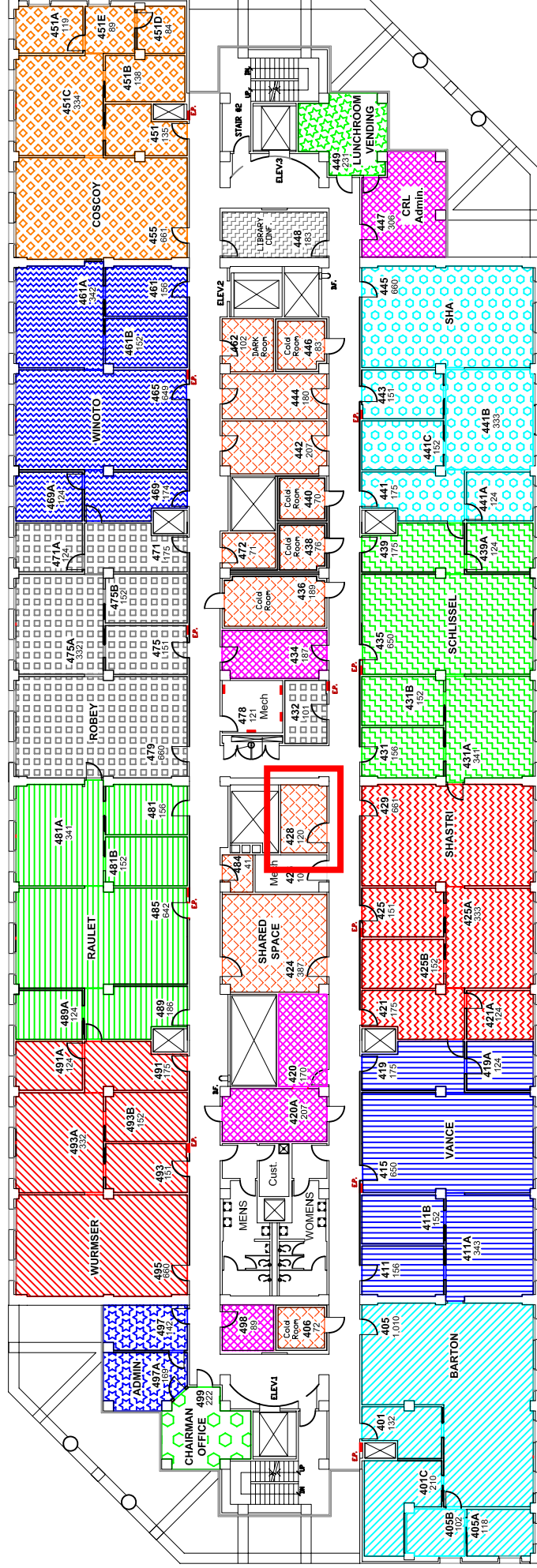
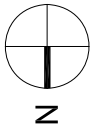
Please enter the number of laboratory alteration projects completed by the applicant in the past 2 years (in the range of \$1-5 million in project cost), and the approximate total dollar value that these projects represent.

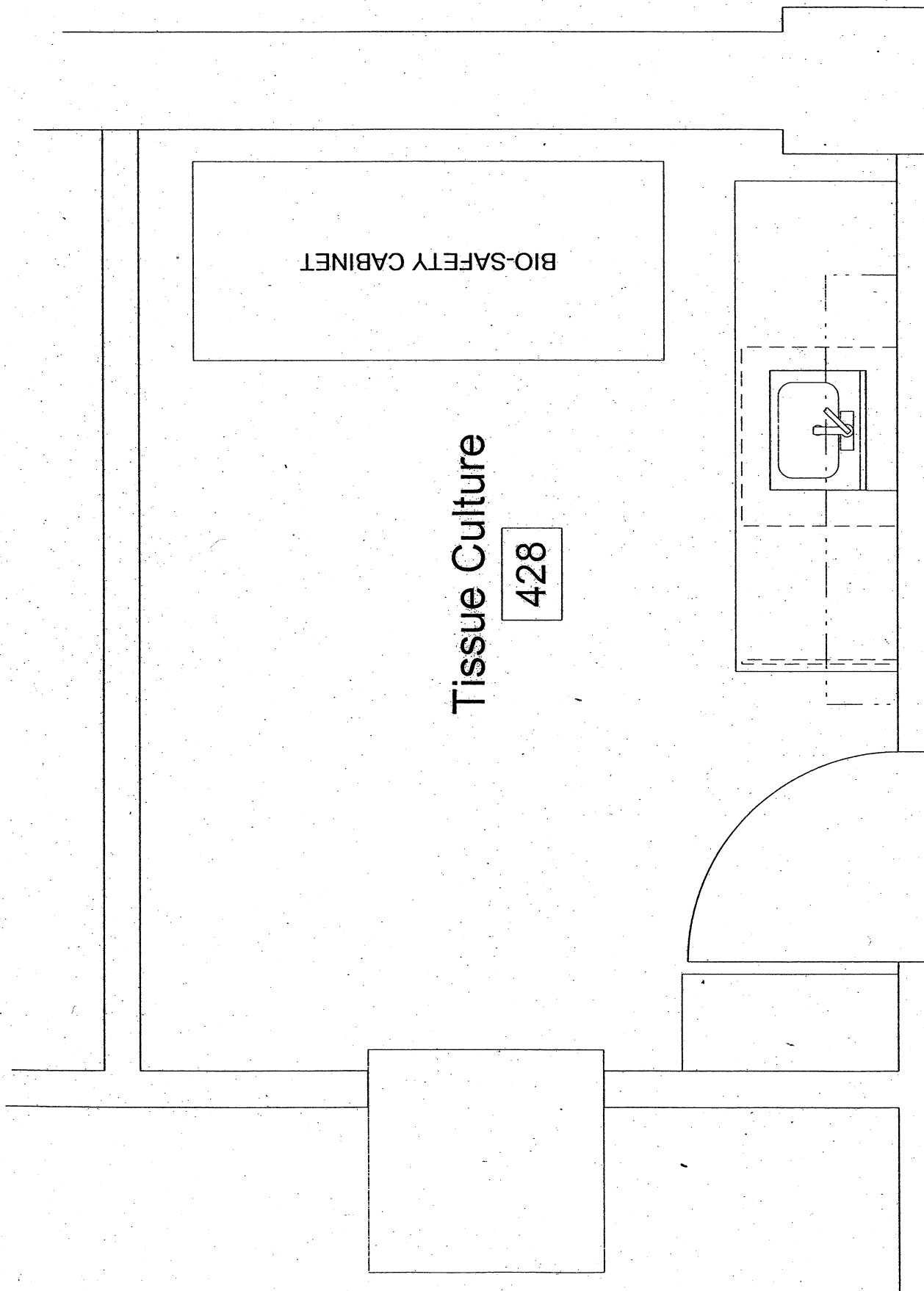
Total Laboratory Alteration Projects

Approximate Total Value

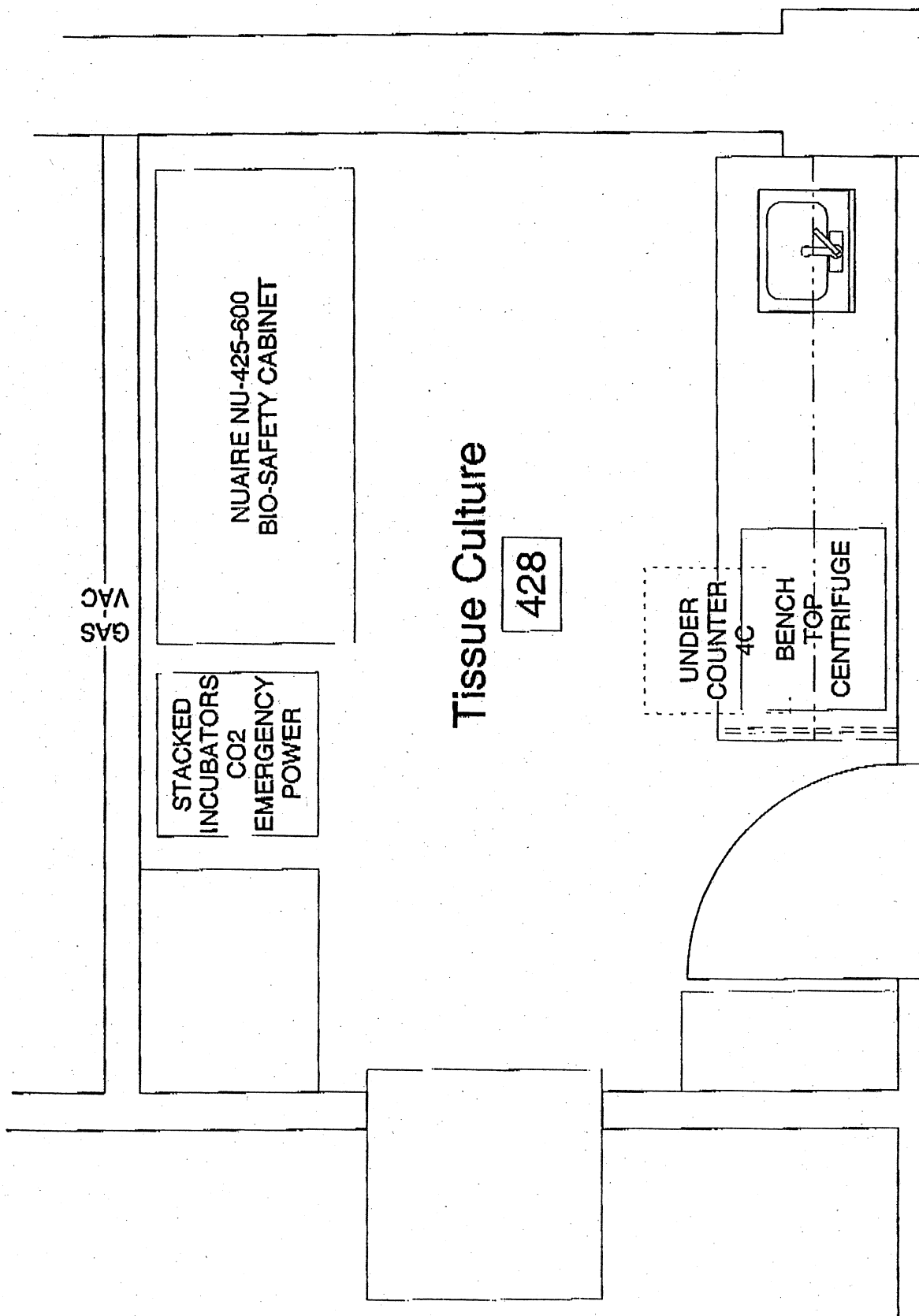
Limit Budget Justification to visible field area.

LIFE SCIENCES ADDITION (CAAN 1225)
FLOOR 4 - 5/5/06





Life Sciences Addition, CIRM Proposal, floor plan of existing space

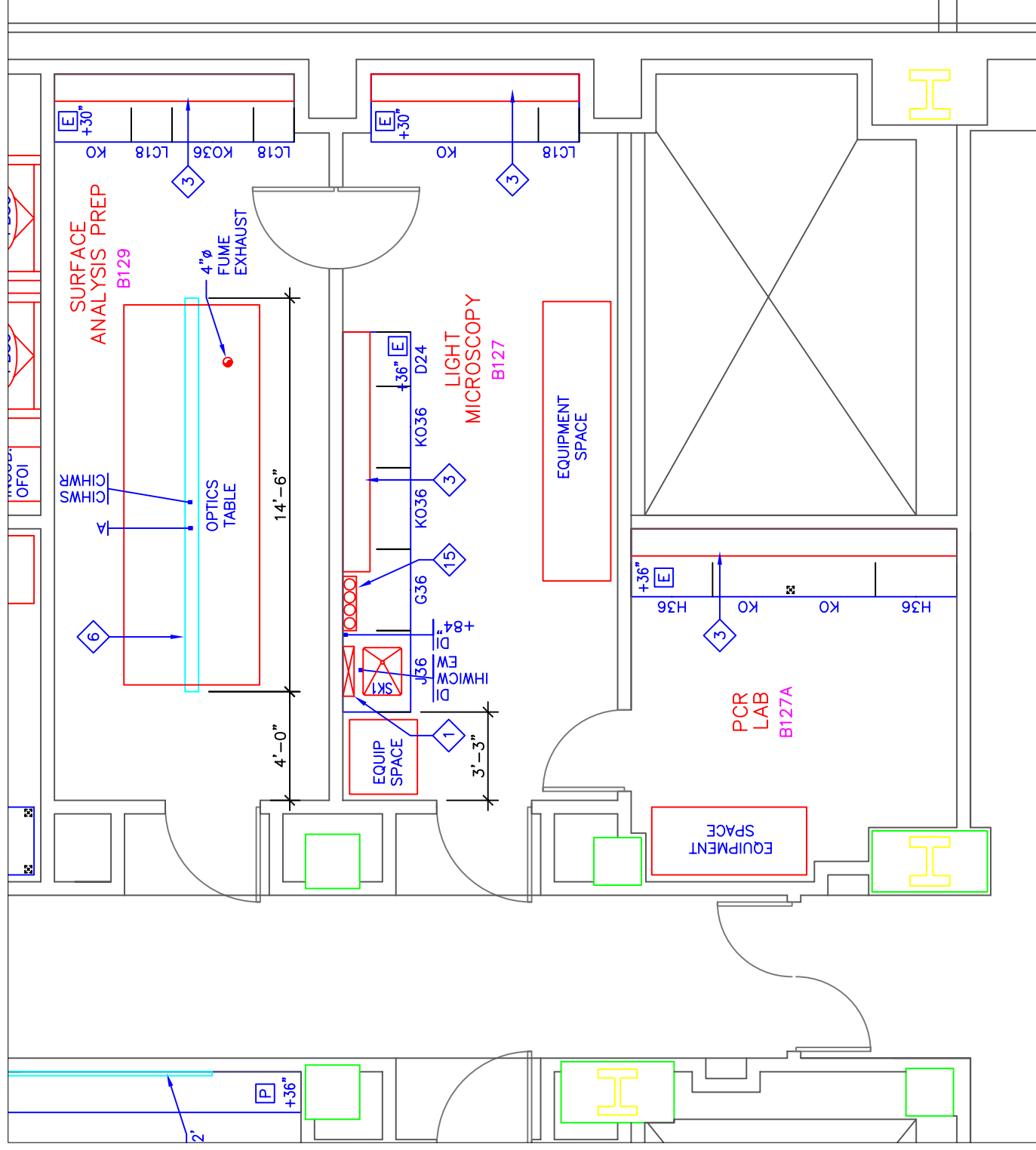


Life Sciences Addition, CIRM Proposal, floor plan of proposed remodel

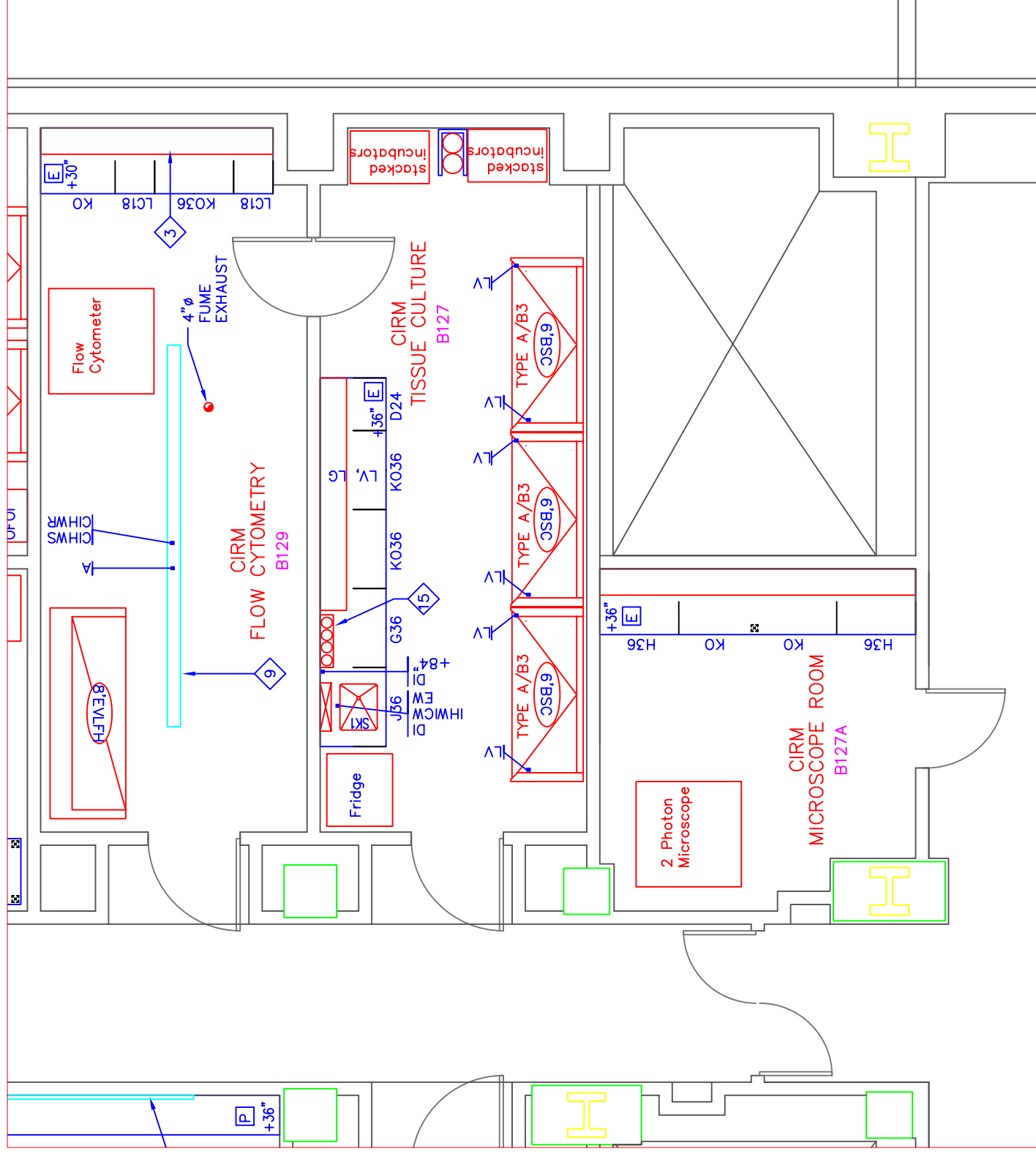


Stanley Hall Basement Level B1

ROOM LEGEND				
PRIMARY FACILITIES	Main Research Laboratory (MRL)	Bio Nano Center (BNC)	Inging	
	Instrument Room	Bio Engineering Teaching Lab	Specialized Optics	
	Equipment Room	Light Microscopy	NMR Facility	
	Workroom		Core Facilities	
SUPPORT FACILITIES				
Cold Room	Dark Room	PI Office		
Warm Room	Tissue Culture	Function Office		
Autoclave only	Crystal Growing	BioE Office		
Autoclave and Glass Wash	X-Ray	QBS Office		



Stanley Hall, CIRM Grant, floor plan of existing space, Scale: 3/16"=1'



Stanley Hall, CIRM Grant Proposal. Rooms B127A, B127, B129
Scale: 3/16"=1'

Section B.2 Budget
The Berkeley Human Embryonic Stem Cell Shared Research Laboratory

Renovation Budget

Item No.	Description of Work	Estimated Cost
<u>Stanley Building Room B127:</u>		
1	Remove door to B127A	2,000
2	Furnish and install three 6' Class A/B3 non-exhausting biosafety cabinets	30,000
3	Extend lab vac to each side of each biosafety cabinet	6,000
4	Install emergency power outlets to serve the biosafety cabinets	8,000
5	Remove existing casework on east side of room	2,000
6	Furnish and install cylinder rack to serve two pairs of stacking incubators	3,000
7	Install emergency power outlets to serve the incubators	8,000
8	Furnish and install Millipore wall-mounted water purification system where shown at Note 15	8,000
9	Add lab vacuum and lab gas on prep bench where shown	6,000
10	Furnish and install doors/drawer combo cabinet in one knee opening area of prep bench for additional storage	2,000
11	Install adjustable 24" deep shelving on unistrut on either side of the bank of biosafety cabinets	2,500
12	Replace ceiling tiles with mylar-faced panels	3,000
13	Rekey door B127	500
14	Room and hazard signage	1,000
15	Patch and paint	3,500
16	Seismic anchorage of misc equipment and stacked incubators	4,000
<u>Stanley Building Room B127A:</u>		
Provide laser safety requirements due to use of Ultra-Fast Imaging Laser (items 17-19):		
17	Laser curtain--fire-rated	2,500
18	Emergency power-off shunt switches	4,500
19	Laser-in-use lights and signage	3,500
20	Fan-coil unit, power and cooling water connections	20,000
21	Localized UPS system for new instrumentation	3,000
22	Electrical outlet, grounding and clean power modifications	10,000
23	Remove air diffusers and replace with linear slot diffusers	3,500
24	Lighting dimmer system	5,000
25	Install new rated door assembly in 1 hour occupancy separation wall	3,000
26	Rekey new door B127A	500
27	Provide new data cabling and terminations	3,000
28	Rebalance and test	4,000
29	Room and hazard signage	1,000
30	Patch and paint	2,500
31	Seismic anchorage of misc equipment	3,000
<u>Stanley Building Room B129:</u>		
32	Furnish and install 8' exhausting vertical laminar flow fume hood (NuAire model #NU-156-624 vertical laminar flow clean air wet process fume hood).	40,000
33	Provide stainless steel exhaust duct branch and connect to exhaust main	16,000
34	Extend process piping and drains to hood	9,000
35	Modify ceiling at hood	3,000
36	Provide booster fan to overcome static pressure	15,000
37	Power the hood and the booster fan with emergency power	9,000
38	Revise outlets for flow cytometer in existing overhead service carrier and convenience outlets on the wall behind it	6,000
39	Provide emergency safety shower/eyewash station, extend domestic water and route eyewash to drain	7,500
40	Rekey door B129	500
41	Provide new data cabling and terminations	3,000
42	Rebalance and test	10,000
43	Room and hazard signage	1,000
44	Patch and paint	5,000
45	Seismic anchorage of misc equipment	4,000
<u>Life Sciences Addition Room 428:</u>		
46	Disconnect existing bio-hood from exhaust air duct	1,500
47	Remove and decon existing glove box exhaust	1,000
48	Cap duct in ceiling	500

49	Remove existing sink, bench and upper cabinets & decon	3,000
50	Decon and remove bio-hood	1,500
51	Repair ceiling and walls (patch, sand, paint) as required	2,000
52	Fabricate and install new wet bench	2,500
53	Install two rows of adjustable shelves	1,500
54	Fabricate and install new microscope table	2,500
55	Furnish and install one 6' Class A/B3 non-exhausting biosafety cabinet	10,000
56	Install electrical for bio-hood, incubators (emergency), centrifuge, microscope, undercounter refrigerator and bench	6,000
57	Install light on south end of ceiling	2,000
58	Install 2 vacuum lines for bio-hood	2,000
59	Reinstall sink	1,500
60	Assemble hood and incubators, brace as required	1,500
61	Rebalance and test	5,000
62	Room and hazard signage	1,000
63	Seismic anchorage of misc equipment	3,000
	SUBTOTAL 1	335,500
	Construction Contingency	33,000
	SUBTOTAL 2	368,500
	Design and engineering fees	15,775
	Project management, contract admin and accounting	15,000
	Inspection and testing	12,000
	Advertising	1,500
	Reproduction, as-builts	5,000
	CEQA finding	1,000
	Fire marshal review and inspections	5,000
	TOTAL CIRM FUNDS REQUESTED	423,775
	MATCHING FUNDS (20%) (from Stanley Building construction costs)	105,944
	See Section B.4 for explanation and detail	

Note that Items 13, 26, 27, 40 and 41 are construction items intended to be undertaken by campus forces. Other Items are anticipated to be undertaken by construction contractors.

Movable Equipment Budget

Item No.	Description of Work	Estimated Cost
	<u>Stanley Building Room B127:</u>	
1	Forma Incubators (4)	20,000
2	Fisher Refrigerator	5,000
3	Zeiss Tissue Culture Fluorescence Microscope	40,000
	<u>Stanley Building Room B127A:</u>	
4	Zeiss Two Photon Confocal Fluorescence Microscope	418,000
	<u>Stanley Building Room B129:</u>	
5	Beckman-Coulter Flow Cytometer	122,000
6	Freezers and cryogenic storage	20,000
	<u>Life Sciences Addition Room 428:</u>	
1	Forma Incubators (2)	10,000
	<u>Life Sciences Addition Room 418:</u>	
7	Dako-Cytomation Fluorescence Activated Cell Sorter	565,000
	TOTAL EQUIPMENT BUDGET	1,200,000
	TOTAL CIRM REQUEST	1,000,000
	MATCHING FUNDS (\$200,000 institutional funds plus \$50,000 Stanley Building construction costs)	250,000

Appendix A

Application: CL1-00519-1

Title: The Berkeley Human Embryonic Stem Cell Shared Research Laboratory

Public Abstract:

Investigators from three major regional research and clinical institutions have instituted a stem cell research center. Numerous collaborations among our community of investigators have successfully utilized both Federal registry and non-registry human embryonic stem cell (hESC) lines in the center; however, the available resources for the culture and maintenance of these lines place inherent limitations on the research. We therefore propose to establish a Human Embryonic Stem Cell (hESC) Shared Research Laboratory for cell culture and investigation, which will serve as a central resource to greatly enhance stem cell science and technology in the region.

This resource will greatly benefit numerous ongoing research project areas. First, the ability of human embryonic stem cells to self-renew, that is grow and maintain their ability to differentiate into presumably every cell type in the adult body, is a hallmark property this is incompletely understood. Investigations of self-renewal mechanisms will lead to improved approaches to mass produce these cells for numerous therapeutic and diagnostic applications. In addition, understanding how hESCs differentiate into blood cells will enhance the treatment of numerous disorders including cancer, diabetes, and infectious disease. Moreover, studying how hESCs differentiate into numerous types of neurons will have implications for neurodegenerative disorders, including Parkinson's Disease and Lou Gehrig's Disease. Furthermore, regenerative medicine efforts to engineer new cardiomyocytes and blood vessels will improve the treatment of heart disease and congestive heart failure, still the leading loss of life in the United States. Importantly, the ability to control and harness hESCs as a limitless source of differentiated blood cells, neurons, cardiomyocytes, and other cell types will also greatly enhance high throughput drug screening, toxicology screens, and diagnostics efforts. Finally, novel bioengineering approaches to create robust and scaleable technology platforms for expanding, differentiating, and grafting hESCs will benefit all such therapeutic and diagnostic applications.

The Shared Research Laboratory will be located in two nearby sites on the host institution, within a new building and a modern biological sciences building, to provide convenient access to all researchers on campus and in the surrounding community. The Laboratory will provide a central repository and resource for culture and maintenance of numerous lines, and imaging and cytometry analysis. The Laboratory will also build upon our strong tradition of and success with shared core facilities to synergistically enhance our stem cell research capabilities. The resulting culture and analytical facility will thus provide a strong, shared resource to benefit stem cell research in the regional community.

Statement of Benefit to California:

Our Human Embryonic Stem Cell (hESC) Shared Research Laboratory will strongly enhance the scientific, technological, and economic development of California. The most important net benefit will be to human health.

The Laboratory will meld three outstanding research institutions: a university with a history of major contributions to the scientific knowledge and technological capabilities of the State, a research institution that bridges basic science with clinical translation, and a national laboratory with leading research in genomics and cancer biology. This collective expertise is poised to make major advances in stem cell biology and engineering, which will be greatly stimulated by the establishment of a collaborative laboratory for hESC research.

Our proposed Laboratory includes leaders in cell biology, developmental biology, immunology, neuroscience, and bioengineering. This expertise is being applied to understand mechanisms that control hESC self-renewal and differentiation, and the resulting advances will help establish California as a leader in stem cell biology. Furthermore, our team has leaders in regenerative medicine and bioengineering who apply basic biological information to create technology platforms for expanding, differentiating, and grafting hESCs for therapeutic and diagnostic applications. Collectively, this work will impact the treatment of cancer, autoimmune disease, infectious disease, heart disease, and neurodegenerative disorders.

Furthermore, we have a long and successful tradition of translating science into practice through interactions with industry and the clinic. Continuing this history in the area of stem cells will enhance the technological strength and economic development of the State. Finally, this Laboratory will provide a collaborative training environment that will expose many students and fellows to leading, interdisciplinary science and technology, thereby creating valuable future employees of California.